NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD

POND SEALING OR LINING

CATONIC EMULSION WATERBORNE SEALANT

(number)
CODE 521D

DEFINITION

Installing a fixed lining of impervious material or treating the soil in a pond mechanically or chemically to impede or prevent excessive water loss.

PURPOSE

Reduce seepage losses in ponds to an acceptable level.

CONDITIONS WHERE PRACTICE APPLIES

Where water loss from a pond through leakage is, or will be, of such proportion as to prevent the pond from fulfilling its planned purpose, where leakage will damage land and crops or can cause waste of water or environmental problems, and where a seepage reduction of 70 to 95 percent can adequately solve the leakage problem.

CRITERIA

Ponds to be sealed shall be constructed to meet the NRCS Conservation Practice Standard for irrigation pits or regulating reservoirs (552), Irrigation Pits (552A) OR Regulating Reservoir (552B), Irrigation Storage Reservoirs (436), Ponds (378), Waste Treatment Lagoon (359), Waste Storage Facliity (313), or Wildlife Watering Facilities (648) as appropriate.

Soil properties. For electrochemical sealing, soils (in the surface 2 inches) shall have properties approximating the USDA textural soil classification for:

1. Very fine sands, fine sands, medium sands, coarse sands, and very coarse sands.

2. Nonexpansive loamy sand and sandy loam.

If the soil is relatively uniform throughout the entire pond, the seepage rate before sealing shall exceed 1 ft/day, measured vertically. If isolated sections in an area are suspected of causing most of the seepage loss, the seepage rate in the area before sealing shall exceed 1 feet per day.

The minimum rate of application shall be based on small-scale field tests with infiltration cylinders unless sufficient data are available on the field performance of previously tested soils that are similar in texture and chemical properties to the soil to be sealed.

In the absence of field test results for the soils to be sealed, the minimum application shall be 1 gallon per square yard.

PLANS AND SPECIFICATIONS

Plans and specifications for sealing ponds with cationic emulsion-waterborne sealant shall be keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose.

OPERATION AND MAINTENANCE

A maintenance job sheet or maintenance plan shall be provided for each resource management system and practice. The maintenance plans for the pond sealing shall include maintenance requirements for the sealant and all pond components and appurtenances. Maintenance should include inspection of appurtenances on a periodic basis and after each large storm. Failures should be corrected as soon as possible to prevent major damages.

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NATURAL RESOURCES CONSERVATION SERVICE
MISSOURI CONSTRUCTION SPECIFICATION

FOR

POND SEALING OR LINING

CATIONIC EMULSION WATERBORNE SEALANT

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GENERAL

Construction operations shall be carried out in a manner and sequence that erosion and air and water pollution are minimized and held within legal limits.

The completed job shall present a workmanlike appearance and shall conform to the line, grades, and elevations shown on the drawings or as staked in the field.

All operations shall be carried out in a safe and skillful manner. Safety and health regulations shall be observed and appropriate safety measures used.

Application shall be carried out in a manner that erosion and air and water pollution are minimized. The completed job shall present a workmanlike finish.

INSTALLATION

The area to be treated shall be cleared of vegetation and trash. If practical, a soil sterilant shall be applied to the soil before applying the sealant. Water to be treated must not contain suspended sediment in amounts sufficient to coagulate the waterborne sealant. Dry or newly constructed ponds shall be mechanically compacted.

The sealant material shall be inspected before use. Containers shall be checked to see if any asphalt has settled; settled asphalt cannot be easily remixed. If the emulsion contains lumps of asphalt, it shall not be used.

In dry structures, the sealant shall be added at a uniform rate to the incoming water during filling operations so that all sealant is added and mixed when the pond is filled. During treatment, the pond shall be filled from 6 to 12 in. above the normal operating level. The air and water temperature shall be above 40 degrees F.

If the pond is full, the sealant may be pumped or poured around the periphery of the pond at intervals. Immediately after the sealant is add, however, it must be thoroughly mixed and dispersed in the water by a suitable means, such as circulating the water with a large-volume pump. A 72-hour residence time shall be allowed for the sealant to deposit on the underlying soil. A water level of 6 to 12 in. above the operating level shall be maintained during the residence.

The pond shall be kept full of water after treatment to prevent weed growth, drying, and weathering damage to the treated surface.

Treated areas must be protected from mechanical damage, such as puncture by livestock trampling, and from plant growth through the treated surface. Areas near the waterline and at points of concentrated surface flow shall be protected against erosion.

Sediment coagulating chemicals, such as gypsum or iron sulfate , shall not be used to clear pond water after treatment.

MATERIALS

The sealant should be a stable o/w emulsion of suitable bituminous, resinous, or polymeric bases having infinite dilutability and good stability after dilution in all fresh waters of any native hardness. (The emulsion must be infinitely dilutable in the water to be treated without causing the asphalt to break.) Discrete sealant droplets shall be able to coalesce at 40 degrees F of above as they deposit on underlying soil.

The sealant must conform the following specifications and testing procedures (ASTM D2397 applicable to the soil sealant):

Specifications		Cationic soil sealant Minimum	Maximum
Viscosity (Saybolt Furol)122° F (50° C)	s	20	100
Settlement, 5 days	pct	----	5
Particle charge test		Positive	----
Sieve test	pct	----	0.10
Distillation[1/]			
Oil distillate, by volume of emulsion	pct	. ----	3
Residue	pct	60	----
Test on distillation residue			
Penetration, 77° F (25° C)	100 g (5 s)	100	200
Ductility, 77° F (25° C)	cm	40	----
Solubility in carbon disulfide	pct	98	----

1 Evaporation test may be used instead of distillation for percentage of residue and Penetration.

Testing procedures	Test method
Viscosity	ASTM D244
Settlement	ASTM D244
Particle charge	ASTM D244
Sieve	ASTM D244
Distillation	ASTM D244
Evaporation	ASTM D244
Penetration	ASTM D5
Ductility	ASTM D113
Solubility	ASTM D4